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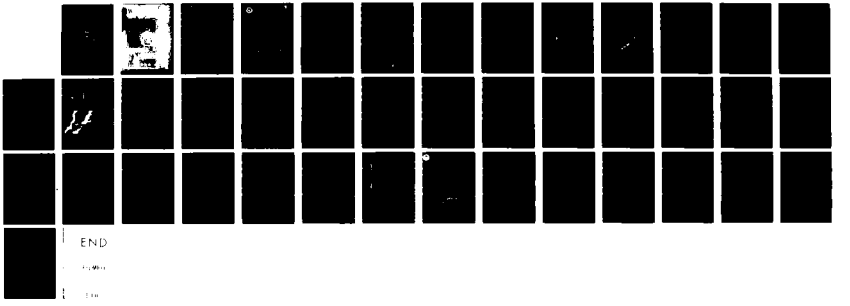

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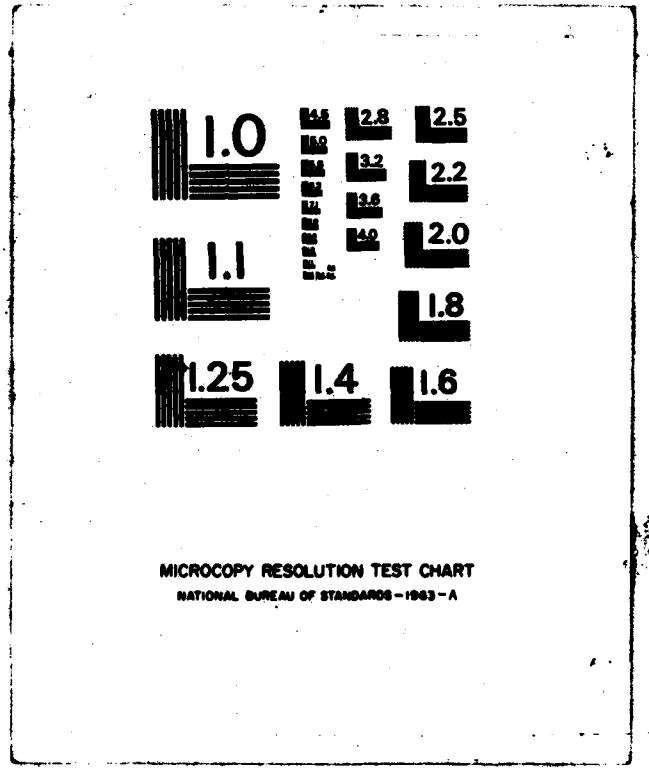
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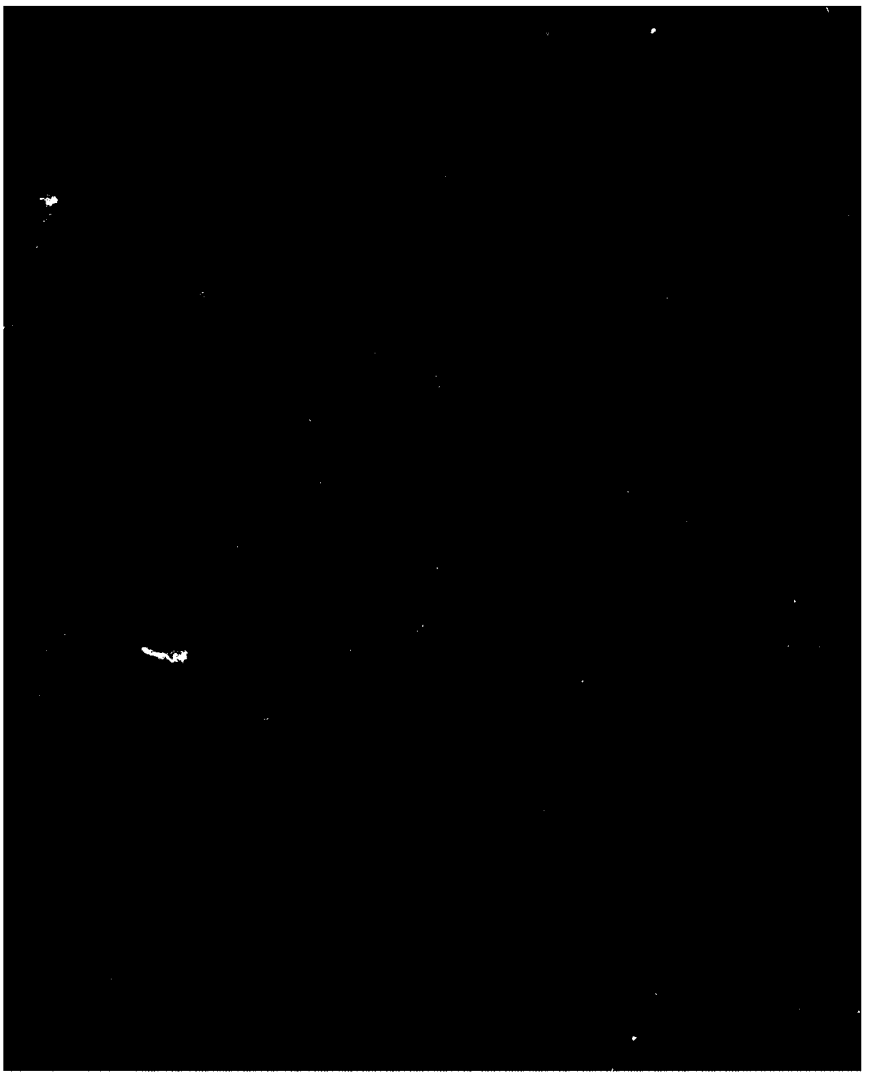

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Lake Traverse

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Constructed for dual purposes of flood control and water conservation, the Lake Traverse-Bois de Sioux flood control project began operation in 1941. It consists of two reservoir pools--Lake Traverse and Mud Lake--plus 24 miles of channel improvement. Several consepts are recommended for future development of the three public-use areas at Lake Traverse. These include expansion of parking facilities , improvement of recreation and restroom facilities, tree and shrub plantings, and improvement of facilities for the handicapped.

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ST. PAUL DISTRICT, CORPS OF ENGINEERS
1135 U. S. POST OFFICE & CUSTOM HOUSE
ST. PAUL, MINNESOTA 55101

REPLY TO
ATTENTION OF:

NCSED-ER

NEGATIVE DECLARATION

In accordance with the National Environmental Policy Act of 1969, the St. Paul District, Corps of Engineers has assessed the environmental impacts of the following project:

MASTER PLAN FOR PUBLIC-USE DEVELOPMENT

AND RESOURCE MANAGEMENT

LAKE TRAVERSE

MINNESOTA - SOUTH DAKOTA

The environmental review process indicates that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement will not be prepared.

The attached environmental assessment summarizes our environmental review. Those who have information which may alter the assessment and lead to a reversal of this decision should notify the District Engineer within 30 days.

10 July 1979
DATE

WILLIAM W. [illegible]
Colonel, Corps [illegible]gineers
District Engi[illegible]

ENVIRONMENTAL ASSESSMENT
LAKE TRAVERSE MASTER PLAN
FOR PUBLIC-USE DEVELOPMENT
AND RESOURCE MANAGEMENT
LAKE TRAVERSE
MINNESOTA - SOUTH DAKOTA

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
1135 U.S. POST OFFICE & CUSTOM HOUSE
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JUNE 1979

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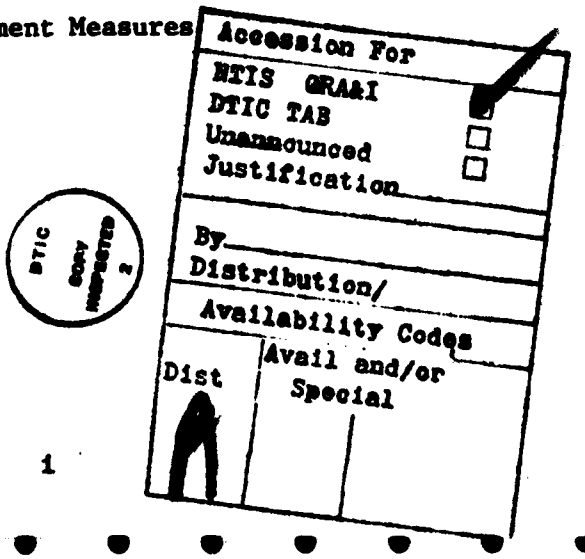

FIGURES

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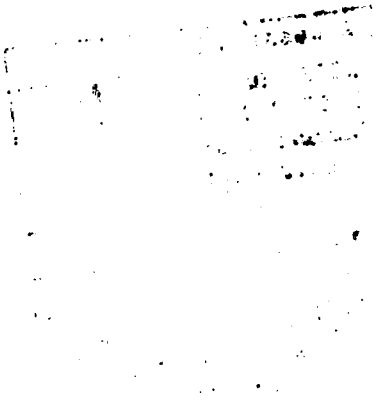

INTRODUCTION

The purpose of this document is to assess the environmental impacts associated with the Draft Master Plan for Public Use Development and Resource Management, Lake Traverse, Minnesota - South Dakota.

1.00 PROJECT DESCRIPTION

LOCATION

1.01 Lake Traverse is the headwaters of the Bois de Sioux River, the main tributary of the Red River of the North. The Lake Traverse - Bois de Sioux project is located on the State boundary between Minnesota and South Dakota. (See figure 1.) Brown's Valley, Minnesota, marks the southern end of the project area; the northern end of the project area (including the 24 miles of channelization) is a point about 6 miles south of Breckenridge, Minnesota.

PROJECT AUTHORIZATION

1.02 Flood Control Project - Authorization for Federal participation in the Lake Traverse - Bois de Sioux flood control project was provided by the Flood Control Act of 22 June 1936, and by the formation of the Tri-State Waters Commission, which provides for local cooperation by the States of Minnesota, North Dakota, and South Dakota. The Flood Control Act of 28 June 1938 made operation and maintenance of civil works projects a Federal responsibility.

1.03 Public-Use Development - Public-use development at Lake Traverse was made possible by the enactment of Section 4 of the Flood Control Act of 1944, as amended by Section 207 of the Flood Control Act of 1962, which authorizes the Chief of Engineers to construct, maintain, and operate public park and recreation facilities at water resource development projects under the control of the Department of the Army. In the future, continued development of recreation at Lake Traverse would be possible through the Federal Water Project Recreation Act of 1965 (Public Law 89-72), which requires non-Federal cooperation and cost sharing for recreation and fish and wildlife enhancement at reservoir projects. This act also establishes development of recreational potential at Federal water resources projects as a full project purpose.

BACKGROUND

1.04 Constructed for dual purposes of flood control and water conservation, the Lake Traverse - Bois de Sioux flood control project began operation in 1941. It consists of two reservoir pools--Lake Traverse and Mud Lake--plus 24 miles of channel improvement extending from the north end of Mud Lake to the project's northern limit. (See figure 2.)

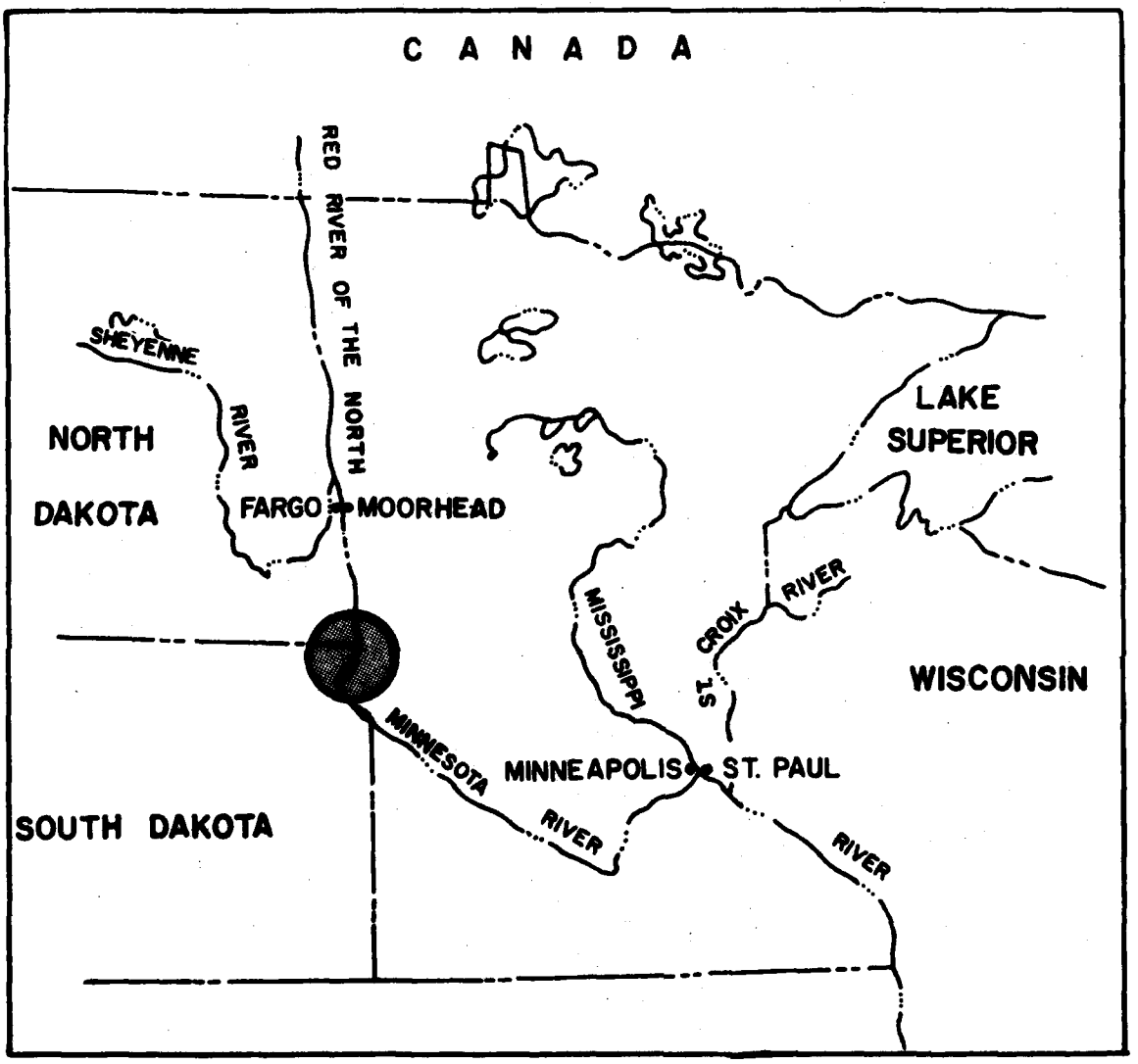

Figure 1 Project Location

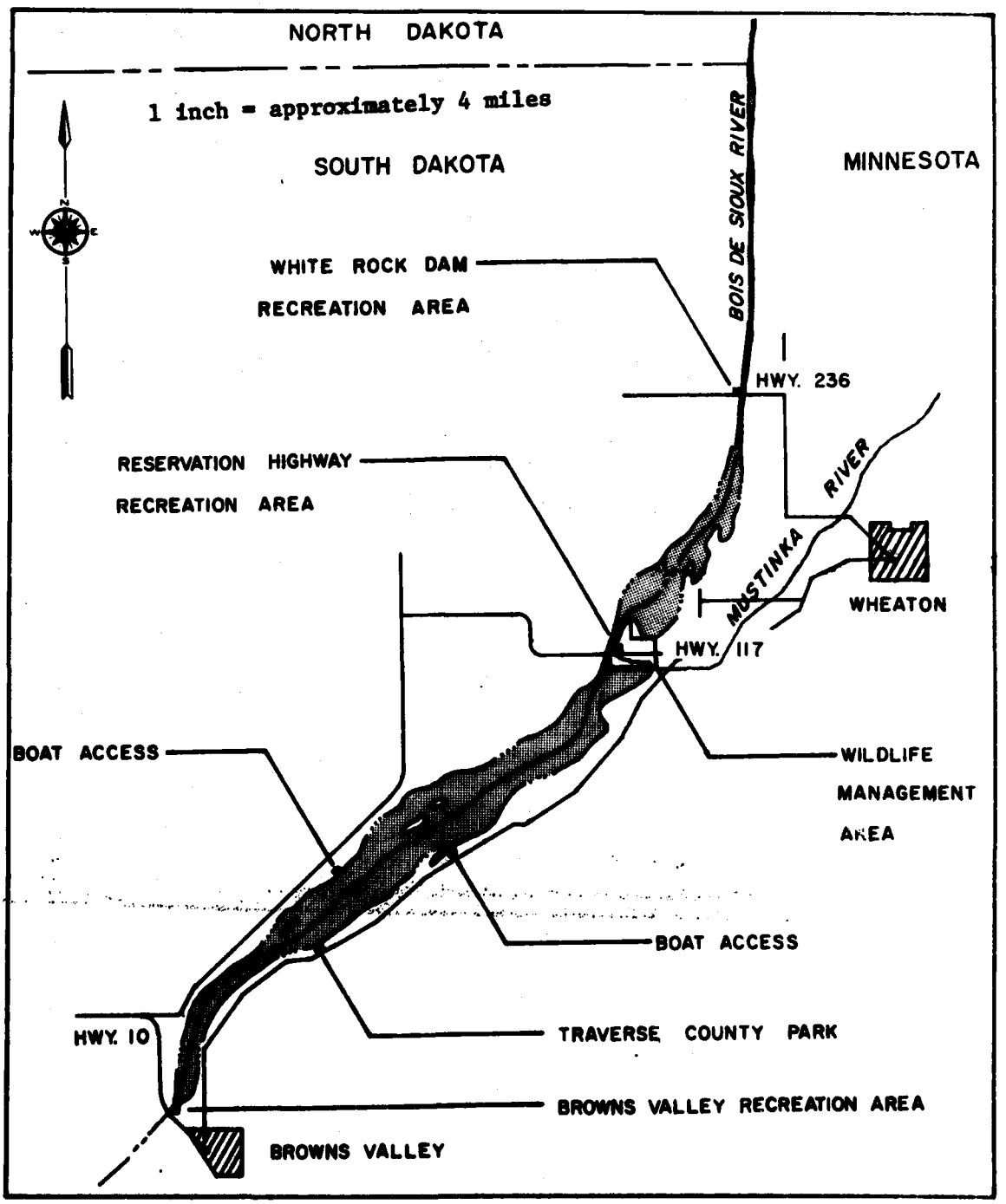

Figure 2 Project Area

1.05 The main tributaries of the Bois de Sioux River and Lake Traverse are Bobcat Creek and the Mustinka River. During floods, excess water is diverted from Lake Traverse to Mud Lake as rapidly as possible by removal of stop logs in Reservation Dam to prevent a material rise in the reservoir pool until the pool levels are equalized. Thereafter, both pools are raised in unison.

1.06 The spring breakup occurs later on the Red River of the North than in the Lake Traverse watershed. Therefore, to avoid increasing downstream flood heights, a release of flood storage from White Rock Dam is not made until conditions are favorable, usually about the first of May. When such releases are made, emergency conditions downstream govern the rate of discharge except during emergency conditions in the reservoir.

1.07 Lake Traverse is an open-water lake surrounded for the most part by farm fields and pastures. The northern and southern ends are bordered by marsh vegetation and willow/cottonwood stands. The lake is elongated, extending about 16 miles from Brown's Valley Dike northeast to the Reservation Highway control structure. Its average width is 1-1/2 miles and average depth 13.2 feet (during normal water levels).

1.08 Mud Lake with its associated wetlands is about 7-1/2 miles long, extending from the Reservation Highway control structure north-northeast to the White Rock Dam. The water is shallow, about 1 to 2 feet deep, and interspersed with dense stands of cattails and bulrushes. The lake is an important resting spot for migratory waterfowl.

1.09 Project Lands and Use - Corps lands around Lake Traverse consist of 1,144 acres in fee ownership (including meandered lands) and 6,172 acres in flowage easements. Of the land in fee ownership, 1,356 acres are leased: 945 to the Minnesota Department of Natural Resources (DNR) for wildlife refuges, 401 to local farmers for cultivation and grazing, and 10 to Traverse County for recreation. The land leased to the Minnesota DNR is located adjacent to the Reservation Highway and consists of marsh and stands of willow and cottonwood. Land leased to local residents is mostly grassland. Of the land remaining in Corps control, approximately 8 acres are devoted to the three public-use areas at Brown's Valley Dike, Reservation Highway, and White Rock Dam. Management of Corps-administered waters and related lands is coordinated with those agencies and individuals who share use and/or have an interest in the lakes and recreation facilities for which the Corps of Engineers does not have responsibility.

EXISTING RECREATIONAL FACILITIES

1.10 Public-use facilities at Lake Traverse - Mud Lake are located in three developed areas: White Rock Dam Recreation Area, Reservation Highway Recreation Area, and Brown's Valley Dike Recreation Area. (See figure 2.) White Rock Dam Recreation Area, the northernmost of the three, is located on Minnesota State Highway 236. Reservation Highway Recreation Area, between Mud Lake and Lake Traverse, is located on Minnesota State Highway 117. The southernmost area, Brown's Valley Dike Recreation Area, is located on South Dakota Highway 10.

1.11 White Rock Dam Recreation Area - The recreation facility at White Rock Dam has the least potential for expansion of the three Corps facilities on Lake Traverse. It is an area of approximately 3 acres created by fill and bordered by Minnesota State Highway 236, the Bois de Sioux River, and Big Slough, which empties into the Bois de Sioux River. There is no suitable area remaining in which to expand facilities. Therefore, future expansion would require substantial amounts of fill and the associated stabilization practices. Existing facilities are not designed for use by handicapped persons.

1.12 The relationship between parking space and activity space is balanced, preventing overuse of the resource. There is parking for approximately 20 cars but the parking lot is a dead end, creating potential circulation problems. The site lacks trees and other elements of visual interest. Facilities consist of temporary restrooms, a picnic area, a bank fishing area, a playground, water supply, and access to hunting areas.

1.13 Reservation Highway Recreation Area - The Reservation Highway Recreation Area consists of approximately 3 acres located next to the control structure which forms the main conservation reservoir of Lake Traverse. It is an area of high visual interest. Bordered by open water and marsh, the recreation area has a wide view of the surrounding bluffs. The relationship of parking and vehicular circulation to public-use areas is balanced, preventing overuse of the area.

1.14 Facilities at the recreation area consist of temporary restrooms, a picnic area, bank fishing, and parking space for 16 cars. Existing facilities lack a water supply system. Circulation within the parking area is poor. The lot is a dead end, creating problems when the recreation area receives maximum use and limited sight distance creates a potential hazard. Existing facilities are not designed for use by handicapped persons.

1.15 Brown's Valley Dike Recreation Area - Of the three Corps recreation areas on Lake Traverse, Brown's Valley Dike Recreation Area has the greatest potential for expansion. Enhanced by the bluffs and marsh, views from the dike provide an additional recreation resource. The dike area along the wooded shoreline provides opportunity for expansion of parking and day-use facilities. If potential use areas are not developed in conjunction with the expansion proposed in the Master Plan, crowding and overuse of existing resources will result. In 1972, the Corps placed fill along the dike for development of parking spaces for about 34 cars. The present parking lot accommodates 15 cars and is a dead end design. Limited sight distance while exiting and the dead end design can create circulation problems. A water supply system is lacking and existing sanitary facilities are temporary.

PROPOSED SITE DEVELOPMENT

1.16 The following concepts are recommended for future development of the three public-use areas at Lake Traverse. It is not known whether all of the proposed modifications will be accomplished and, if so, what the time schedule will be. Much depends upon the availability of funding and the priorities set for the individual projects.

1.17 White Rock Dam Recreation Area - Expansion of facilities at White Rock Dam will be limited to the provision of permanent, vault-type restroom facilities and the provision of facilities for the handicapped. Specifically, facilities for the handicapped will consist of surfaced pathways to the picnic area, ramps into the restrooms, and restrooms designed to accommodate handicapped persons.

1.18 Reservation Highway Recreation Area - Recommendations for the Reservation Highway site include the following:

1. Parking expansion for 16 additional spaces. (Fill for the expansion area was placed by the Corps in 1972.)

2. Installation of a containerized water supply system.

3. Bank fishing facilities for the handicapped.

4. Installation of permanent restroom facilities.

5. Selective plantings of trees and shrubs for shade, visual screening, windbreaks, and wildlife habitat.

1.19 Proposed parking expansion will double the capacity of the existing parking lot and improve circulation. The parking lot will remain surfaced with gravel. The water supply system will be a closed system consisting of storage tanks filled with drinking water. Restrooms will be vault-type.

1.20 Bank fishing facilities will consist of a platform designed to accommodate the handicapped. The platform will be incorporated in the reconstruction of bank riprap below the Reservation Highway control structure. The proposed area of bank restoration and riprap is about 200 by 4 feet and is located downstream from the Reservation Dam control structure on the east side of the channel and adjoins the picnic grounds.

1.21 This bank restoration project proposal is a separate project from the Master Plan proposals. The bank restoration project is pending and would be completed when appropriate spring water level conditions occur. A Negative Declaration and 404(b) evaluation on this proposed riprap action were issued on 15 September 1977, and are appended to this Environmental Assessment as exhibit 6.

1.22 Brown's Valley Dike Recreation Area - Improvement of facilities at Brown's Valley Dike will include the following:

1. Parking expansion for 19 additional car spaces.
2. Installation of a closed water supply system consisting of storage tanks filled with drinking water.
3. Selective plantings of trees and shrubs.
4. Installation of permanent vault-type restrooms.
5. Addition of a picnic area with a boardwalk access trail.
6. Addition of a fishing platform.

These proposed facilities will be designed to accommodate handicapped persons.

1.23 The storage tanks and new restrooms would be installed in 1980. In subsequent years, parking spaces and picnic units would be added gradually as demand indicates and as funds become available. The addition of parking and picnic facilities would be coordinated according to need if overcrowding occurs. The picnic facilities would be placed in a 2-acre area having sparse brush and cottonwood trees. Up to 19 new parking spaces would be added and also surfaced with gravel. As parking spaces are added, the parking lot would be redesigned for improved circulation of traffic.

RESOURCES MANAGEMENT PROPOSALS

1.24 Cultural Resources - A cultural display structure would be located at one of the three recreation areas. The display panels will describe the significant archaeologic, historic, and geologic events of the Lake Traverse area. (See paragraphs 2.25-2.31.) A car tour route with a pamphlet can be developed to describe points of interest such as burial mounds, the Ancient River Warren Channel, and settlement sites located in the Lake Traverse area.

1.25 Water Quality - In an effort to improve the water quality of Lake Traverse, Corps-administered lands would be managed to eliminate farming to the lake's edge. A buffer zone of vegetation adjacent to the lake would be created to improve wildlife habitat and help eliminate runoff containing nutrients. Access by livestock from Corps-administered lands to Lake Traverse, Mud Lake, Bois de Sioux River, and their tributaries would be eliminated.

1.26 Wildlife - The Corps-administered lands delineated "Operations: Wildlife Management" on figure 3 will continue to be managed to provide wildlife habitat. Tracts D and F are presently leased to the Minnesota Department of Natural Resources (DNR) for wildlife management purposes. Tracts A, B, C, and E are leased to private individuals for agriculture and grazing, and the remainder of the land is managed by the Corps. As the agricultural and grazing leases expire on Tracts A,B,C, and E, more intensive wildlife management measures will be initiated. As a whole, these areas do not have potential as a refuge (closed area); therefore, they will afford public access. The boundaries of the affected land will be delineated and all grazing will be eliminated. This would improve the upland nesting cover sites for waterfowl and other ground-nesting birds such as pheasants.

1.27 Tract A will be managed as cover habitat interspersed with food plots, to provide winter food and cover for deer and pheasants. This is important because in most winters food and cover are critical. Some of the low sites on Tracts B, C, and E will be improved for waterfowl and semi-aquatic mammals such as muskrats by the construction of shallow wildlife dugouts. These dugouts will complement the larger water areas in the vicinity by providing additional satellite water areas important to nesting ducks.

1.28 These general recommendations provide guidelines for management of the lands delineated "Operations: Wildlife Management" on figure 3. More specific recommendations will be included in appendix D of the Master Plan, Fish and Wildlife Management, to be completed in 1980. The forestry and grasslands management program is also scheduled to be developed by the Corps by 1980 and will be explained in Appendix B of the Master Plan.

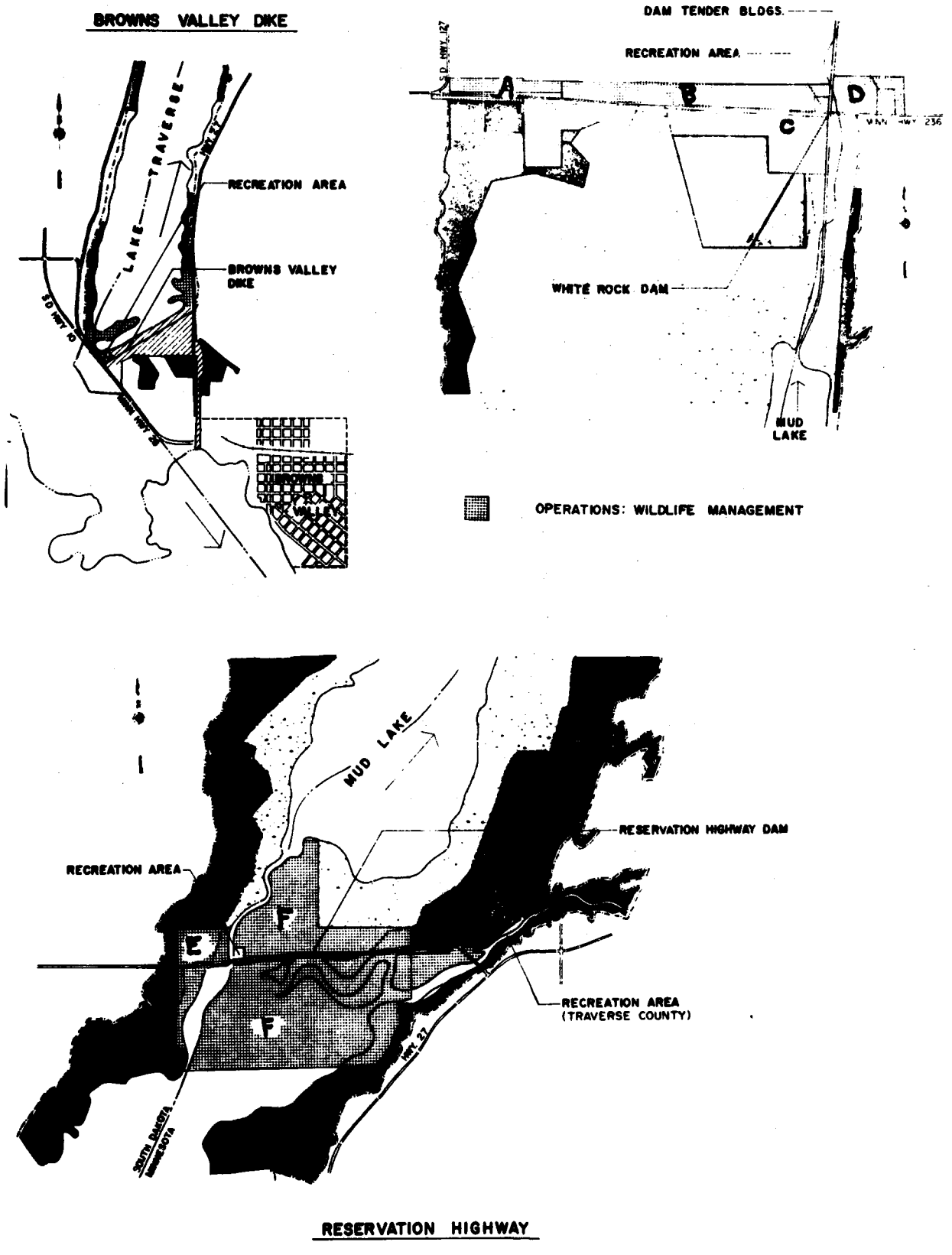

Figure 3. Allocation of Corps-Administered Lands

2.00 ENVIRONMENTAL SETTING

CLIMATE

2.01 The climate in the region is variable. The area is subject to cold winters and warm summers, typical of continental conditions in the temperate zone. The mean annual temperature is about 43 degrees F., with extremes from -44 degrees F. to 114 degrees F. having been recorded. The growing season or the time between killing frosts averages about 113 days , although killing frosts have been recorded in June and August under exceptional conditions. However, during the growing season the climate is generally favorable for the growing of corn, soybeans, wheat and other small grains. The mean annual precipitation over the basin is about 22 inches. More than 76 percent of the precipitation falls during the months of April to October, inclusive.

TERRESTRIAL VEGETATION

2.02 A very high percentage of the land surrounding Lake Traverse is intensively cropped. This, together with heavy grazing to severe overgrazing of the limited rangeland, contributes greatly to the lake's water quality problems.

2.03 Within the project lands, the terrestrial vegetation consists of 11 community types. These types fall into three broad groups: marshland, grassland, and woodland. The woodlands comprise about 10 percent of project lands and are almost entirely included in a tract of land leased to the Minnesota Department of Natural Resources for wildlife management habitat. The majority of project grasslands are leased to local residents and used for grazing. Grazing is adversely affecting vegetation groups C through K in the list below, which outlines the variation within the 11 community types:

a. Cattail/Common Reed/Bulrush Community (common) - This community occupies shallow water areas, particularly at the upper ends of lakes with stable water levels or marsh areas.

b. Willow/Cottonwood Community (common) - This community occupies an area with intermittently standing shallow water and areas with a constant high water table.

c. Cottonwood Community (limited) - This community generally occupies an area with a high water table, just above the high water level of the lakes. Soils are commonly sandy or gravelly.

d. Elm/Basswood Community (limited) - This community occupies an intermediate mesic position on the gentle slopes between the steeper slopes of the valley sides and the old river floodplain.

e. Green Ash/Box Elder/Bur Oak Community (common) - This is the most extensive and variable of the woodland communities. This community occupies the steeper, lower slopes on the sides of the valley and the draws along the sides of the valley.

f. Bur Oak Savanna Community (common) - This community occupies the more xeric zone near the tops of the valley slopes and ravines.

g. Big Bluestem/Switchgrass/Indian Grass Community (common) - This community occupies the mesic zone above the wet meadows. While the surface soils may become relatively dry, the subsoils usually remain moist from a high water table or the area receives supplemental moisture from runoff from higher land. This community supports a diverse vegetative composition.

h. Little Bluestem/Big Bluestem/Needlegrass Community (limited) - This community occupies the more xeric grassland which lacks a high water table or runoff from higher land.

i. Little Bluestem/Stonyhills Muhly/Sideoats Grama Community (common) - This community occupies the more xeric steep slopes and hills where rapid runoff leaves less than average moisture for vegetative growth.

j. Reed Canarygrass/Prairie Cordgrass Community (limited) - This community occupies the zone of nearly continuously wet soils which could also be classified as wet meadow.

k. Tame Grassland Community (limited) - This community is of minor extent and importance in the vicinity of Lake Traverse and Mud Lake.

FISH AND WILDLIFE

2.04 Prior to project construction, Lake Traverse and Mud Lake supported a vast marsh. Upon project completion, a large portion of the marsh habitat was destroyed. Fluctuation of lake levels, water turbidity by winds, and the general shallowness of the lake have also contributed to a loss of wildlife habitat.

2.05 Project lands suitable for wildlife management are presently under lease to the Minnesota DNR for purposes of wildlife habitat management. Through management of leased lands, the Minnesota DNR has begun to mitigate the effects of habitat change. The preservation of existing habitat and the creation of potholes in Mud Lake marsh areas have improved habitat.

2.06 Birds - The project area is important to waterfowl. Lake Traverse serves as a resting place for migratory waterfowl and as a loafing area for molting, local-breeding birds. Lake Traverse is not well suited to waterfowl production as the shorelines are relatively barren. The lake has very little submergent or emergent vegetation needed for food and nesting cover.

2.07 Mud Lake, with its extensive emergent vegetation, has more potential as a waterfowl production area. Blue-winged teal, lesser scaup, pintails, mallards, northern shoveler, redhead, ruddy ducks, and common coots nest in the project area.

2.08 Other common species of birds found in the project area are listed in exhibit 1.

2.09 Mammals - The mammalian wildlife in the project area consists of white-tailed deer (Odocoileus virginianus), occasional moose (Alces alces), and the various small mammals listed in exhibit 2.

2.10 Fish - Fishing is an important activity at Lake Traverse. Because of its status as a boundary water, Lake Traverse receives considerable early fishing pressure and provides local fishing for Minnesotans and South Dakotans. The lake contains a large population of "rough" fish; predominantly carp, buffalo-fish, bullheads and sheepshead. (See exhibit 3.) Fishing is best in spring and fall, when the summer algal blooms can be avoided. Fishing is considered good for white bass, crappie, and bullheads, and fair to poor for walleye and northern pike.

2.11 The States of Minnesota and South Dakota participate in a program that removes rough fish and stocks walleye, northern pike, and crappie, but problems exist that directly affect the fishing and overall recreation use of Lake Traverse. Periodic "winterkill" is a problem, resulting in a fishery dominated by rough fish. Algal blooms and lake turbidity caused by wave and wind action tend to limit habitat and suitable spawning sites for game and pan fish. The States of Minnesota and South Dakota also cooperate in a management program including monitoring of lake oxygen levels and winter rescue operations. Unless water quality is improved, fishing can be expected to decrease in quality, with rough fish as the predominant type.

2.12 Herpetofauna - The reptile and amphibian species probably living in the project area are listed in exhibit 4.

THREATENED OR ENDANGERED SPECIES

2.13 No threatened or endangered species of plants are known to exist in the project area. Animal species which have been given special status by the U. S. Department of the Interior and have been reported within the general area of the watershed are as follows:

Species	Status	Abundance
Arctic peregrine falcon (Falco peregrinus tundrius)	endangered	rare migrant
Bald eagle (Haliaetus leucocephalus	endangered in South Dakota; threatened in Minnesota	occasional migrant
Bobcat (Lynx rufus)	under review	rare to occasional
Canada lynx (Lynx canadensis)	under review	occasional

WATER QUALITY

2.14 Water quality at Lake Traverse is poor. Eutrophication has advanced to the state of algal blooms occurring in summer and early fall. Major causes of eutrophication and the resulting algal blooms may be attributed to:

a. Erosion and the inflow of nutrients from farming operations.

b. Runoff from cattle yards along the lake edge and direct access by livestock to the lake.

c. Sewage wastes from the city of Wheaton and other private residences, and cattle wastes, carried by the Mustinka River into Lake Traverse.

Without proper measures to correct these problems, water quality and the surrounding lake environment will continue to deteriorate. Fishing quality has begun to decrease significantly, and water contact sports are no longer safe due to poor water quality.

SOCIAL SETTING

2.15 Recreation at Lake Traverse - The current condition of water quality at Lake Traverse severely limits development and use of recreational resources. The deteriorating water quality also has a number of impacts on the social well-being of three different groups of people in the study area.

2.15 The first of these groups is the private resort owners, bait shop operators, and other people who rely - at least in part - on the recreational use of the reservoir for their livelihood. These people originally invested in recreation services on what were, at the time, prudent grounds. Now, however, continuing degradation of the sport fishery and the deteriorating water quality of the reservoir adversely affect this group's ability to maintain sufficient economic return on their investment. It should be noted that while many groups of people in the area (e.g., farmers, the city of Wheaton) contribute to the degradation of water quality at Lake Traverse, the resort owners, bait shop owners, etc., bear an unequal proportion of the adverse economic effects.

2.16 The second group being adversely affected is people in the area who have used and would like to continue to use the reservoir for recreation. Due to the present water quality conditions, however, these people are left with two choices: 1) forego quality recreation, or 2) travel to other areas for their recreation. When some prospective recreationists perceive the inconvenience of travelling elsewhere as outweighing their desire to recreate, a loss in total area recreation will result. Those people willing to travel elsewhere will have to spend extra time and money for recreation of similar quality.

2.17 The third group being adversely affected is people living near the reservoir. The water quality at Lake Traverse causes a foul odor. This odor is extremely unpleasant for the residents; moreover, recent medical research indicates that odor, like noise, can cause direct physical effects on health. This odor may also affect local residential property values.

2.18 Resolution of the water quality problem at Lake Traverse would be of tangible, quantifiable benefit to these three groups of people. In the meantime, development of a master plan for recreation can only be done on a short-term, small-scale basis.

2.19 Population - The population of the five-county area has shown a large decline since 1960 (see table below). The factors contributing to this decline and to the current composition of the population may have impacts on the recreational needs and preferences of people in the study area.

2.20 Three factors appear to have contributed to this decline during the decade 1960-1970. The first of these factors is a significant aging due to a marked increase in proportion over 62 years old. The second factor is the out-migration of those young adults between the ages 20 and 39. The third factor is a decline in birth rate. An example of this is evident in Big Stone County, Minnesota, where the number of children under 5 years declined by 42.1%. The data warranting this three-part interpretation of the population decline in the study area are available in the 1970 General Population Characteristics of the U. S. Bureau of the Census.

POPULATION: 5-COUNTY AREA

	1960 Pop.	1970 Pop.	% Change
Roberts County, S.D.	13,190	11,678	-11.5
Grant County, S.D.	9,913	9,005	-9.2
Traverse County, MN	7,504	6,254	-16.6
Stevens County, MN	11,262	11,218	-0.4*
Big Stone County, MN	8,954	7,941	-11.3

*This small decline, compared to the other counties, is at least partially due to the expansion of the University of Minnesota at Morris.

Source: 1970 Population Characteristics Publication of the U. S. Bureau of the Census.

2.21 Usually, recreation use will increase when population is constant because people generally acquire more leisure time and higher income. However, in the Lake Traverse area, typical increases in recreation use will probably not offset the decline in population because the decline is occurring in an age group (20-39) with a high usage of recreation facilities. Therefore, recreation use will probably decline.

2.22 Major communities providing basic services to the surrounding area are: Morris, Minnesota (1970 pop. 5366), Sisseton, S.D. (1970 pop. 3094), and Wheaton, Minnesota (1970 pop. 2029).

2.23 The economy of the area centers on agriculture, with an employment percentage well above the State average. Median family income ranges between $5,500 and $7,500, approximately $2,500 below respective State averages. The percentage of the population with income greater than $15,000 is well below State averages.

2.24 With a predominantly rural population and median family income below the State averages, indications are that recreation preferences will center on activities based on natural resources, requiring little investment in equipment (hunting and fishing).

CULTURAL RESOURCES

2.25 Prehistory and History - Evidence of nomadic big game hunters, often referred to by archaeologists as Paleo-Indians, has been found near Lake Traverse and Brown's Valley. Excavated materials consist of a human skeleton, Brown's Valley Man, in association with distinctive stone knives and projectile points that date to about 6,000 B.C. This is the only site in Minnesota that has been definitely attributed to the Paleo-Indians, the earliest occupants of the Great Plains.

2.26 Following a climatic change to more moderate temperatures, a number of new food resources became available to prehistoric people. Communities appear to have been less nomadic and subsistence patterns were based on locally available foods. The archaeological record indicates greater cultural diversity resulting from adaptations to different environments. These adaptations to local resources are considered part of a widespread cultural pattern known as the Archaic tradition, which dates from about 5,000 B.C. to 1,000 B.C. It was during this period that the use of copper for fashioning weapons, tools, and ornaments originated in the Upper Great Lakes region and spread to the Red River Valley. There are a number of Archaic sites known to exist along the former beaches of glacial Lake Agassiz. It is likely that similar Archaic sites exist in the Lake Traverse area.

2.27 The next period, known as the Woodland, is distinguished from the Archaic by the appearance of pottery and the construction of burial mounds. The use of copper became less common and bone and antler tools are often found. A number of burial sites of this time, including the Round Mound, Fire Mound, K. Mound, Wilson Mound, and Shady Dell site on the eastern side of Lake Traverse and the De Spiegler site near Big Stone Lake were excavated by archaeologists 20 to 40 years ago. Several of these sites contain components of the enigmatic Arvilla Complex which seems to have spread from Wisconsin across central Minnesota and along the Red River Valley during the period from 500 A.D. to 900 A.D.

2.28 About 1,000 A.D., the Woodland tradition was replaced in many areas by the Mississippian tradition, which developed and spread along the Mississippi and tributary river valleys. The Mississippian presence is evident at the Round Mound site which has a second occupation dated at about 1,300 A.D. The Mississippian tradition is distinguished by the intensive cultivation of maize and beans which made a sedentary village complex possible.

2.29 The Cheyenne Indians reportedly lived in the Lake Traverse area as agriculturists. With the introduction of the horse and the displacement of Indian groups from the east, the Cheyenne moved onto the plains of the Dakotas and dramatically changed their lifestyle to that of nomadic buffalo hunters. The Teton, Yanktonai, Sisseton and Wahpeton Sioux also occupied historic villages along the upper Minnesota River. The Sisseton and Wahpeton still live on the former reservation on the west bank of Lake Traverse. The government Indian agency building was located about 15 miles west of Brown's Valley.

2.30 There were active fur trading operations in the Lake Traverse area starting early in the 19th century. One of the early fur posts was established by Robert Dickson for the English Northwest Fur Company. Dickson had been appointed superintendent of the western Indians for the British government. His influence was such that he led several groups of the Dakotas against the U.S. at Prairie du Chien during the War of 1812. His post was located on the southeast shore about 6 miles from Brown's Valley and consisted of several buildings. In 1823, the Columbia Fur Company, founded by Joseph Renville, established a post known as Fort Washington in the same area. The American Fur Company established a post in 1824 with Henry Fisher in charge. In 1844, the American Fur Company established another post on Big Stone Lake.

2.31 Following the Sioux Uprising in 1862, the United States government decided to build a fort near the Indian reservation. The fort was called Fort Wadsworth but the name was later changed to Fort Sisseton. It was located about 24 miles west of the present town of Sisseton. From the time the fort was built until 1871, when the railroad reached Morris, the Wadsworth Trail was used for transporting supplies to the fort and reservation. This trail passed from St. Cloud to Sauk Center, to Glencoe, Gager's Station, Frisbys Grove, Tocqua, Brown's Valley, the Indian Agency, Buffalo Spring, and Fort Wadsworth. One of the central figures in the development of southwestern Minnesota was Joseph R. Brown. He served as administrator of Indian affairs at Fort Wadsworth. In 1866 he moved his house from the fort to a site which became the first post office at Lake Traverse. In 1871 his son, Samuel Brown, moved this post office to its present location in Memorial State Park and named the new location Brown's Valley. It was in the same year that the area was opened up by the government for settlement.

PROJECT VISITATION

2.32 Overcrowding is often a problem at the three recreation areas on Lake Traverse. Due to the popularity of fishing, the picnic areas and parking lots are often overcrowded. During 1975, recreation days of use at Lake Traverse totaled 84,698, distributed as follows:

White Rock Dam Recreation Area - 29,918

Reservation Highway Recreation Area - 28,990

Brown's Valley Dike Recreation Area - 25,590

Mustinka Park (leased to Traverse County) - 5,200

Percentages of Visitor Activity:

Picknicking - 40 percent	**Boating - 5 percent**
Swimming - 5 percent	**Fishing - 65 percent**
Sightseeing - 15 percent	

(Because the average recreation visitor engages in several different activities, the total activity reported is greater than 100 percent of the recreation days of use.)

2.33 Project visitation estimates for Lake Traverse indicate the public use will peak in 1980 and then begin to decline within the next few years. Because visitation increases appear to be short term, present project land area should be sufficient to accommodate increased recreation use. Also, the size and nature of the sites and surroundings limit the amount of use that could be absorbed, thus limiting their development potential.

2.34 Access - Access to the project area is provided by a system of Federal, State, and county highways. These roads are adequately maintained and capable of accommodating the visiting public. No relocation or supplement to public roads is necessary as a result of the proposed development.

3.00 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

3.01 This section discusses the probable environmental impacts associated with the improvements proposed in the Master Plan. The parameters listed in Exhibit 5 have all been reviewed and considered as part of this assessment.

NOISE LEVELS

3.02 Construction of the permanent restrooms and expansion of parking areas would temporarily increase noise levels from the operation of construction equipment. Noise sources would be trucks, earthshaping equipment, and general human activity. The minor increase in noise levels during construction could be disturbing to people using the recreation areas. Most work would be scheduled to avoid this, but undoubtedly some work would be done during the recreation season. The overall effect should be negligible, in view of the small scope of the projects and short duration of the active construction periods.

3.03 The end result of improved recreational facilities would be an increase in noise levels at Lake Traverse until about 1980. (Recreation use is expected to decline after 1980.) Improvement and expansion of parking and picnic facilities would attract more visitors. More people and more vehicles at the recreation sites would result in increased noise levels. This greater noise could be disturbing to individual visitors.

AESTHETIC VALUES

3.04 There would be some construction disturbances such as soil disturbances and truck traffic that would detract from the aesthetic quality of the recreation areas. Once construction is completed, all disturbed areas would be graded and replanted.

3.05 Selective plantings are proposed to provide visual screening, windbreaks, shade, and wildlife habitat at all three recreation sites. Native shrubbery, seedlings, saplings, and, in some cases, semi-mature trees would be utilized for these plantings.

3.06 The natural aesthetic quality of Lake Traverse would be improved by allowing re-establishment of natural vegetation on 401 acres of lands where grazing is presently allowed by lease.

CULTURAL RESOURCES

3.07 Under the mandate of Executive Order 11593 for the Protection and Enhancement of the Cultural Environment, the Corps is required to locate, inventory, and nominate to the Secretary of the Interior all sites, buildings, districts, and objects under its jurisdiction or control which appear to qualify for listing on the National Register of Historic Places. These requirements have not yet been fulfilled on lands at Lake Traverse owned by the Corps or affected by operation and maintenance of the reservoir.

3.08 The expansion and alterations at the three public use areas may disturb and/or destroy unknown historic and prehistoric archaeological sites. Cultural resource investigations, including review of documents, site surveys, and test excavations, will be carried out in order to locate any resources and to assess their significance. Once known, the cultural materials can be evaluated for their suitability for incorporation into interpretive facilities. Any cultural remains that would be affected by the proposed construction would be either avoided or scientifically excavated, following consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation.

3.09 Although there are no archaeological, historical, or architectural properties at Lake Traverse currently listed on the National Register of Historic Places, there are 17 known prehistoric sites in the general area. These include petroglyphs, burial mounds, rock cairns, earthworks, and habitation sites. The historic sites are fur posts, the Sisseton Sioux Indian Agency, a major military trail, military forts, and settlement sites. These sites have been identified from early survey records, settlers' reports, and artifacts which appeared when the ground was disturbed by agricultural and construction activity. Many of the sites, though recorded, have not been located on the ground.

3.10 The Ancient River Warren Channel has been formally recognized as a Nationally Registered Natural Landmark. Both Minnesota and South Dakota have erected highway markers to commemorate this geological feature. Regulations require that any Corps project in the vicinity of the Ancient River Warren be evaluated in terms of its impacts on the natural landmark.

MAN-MADE RECREATION RESOURCES

3.11 The proposed modifications would expand the use capacities of the recreation areas. Picknicking and bank fishing would be improved at these facilities. Currently the Reservation Highway Recreation area is used for bank fishing; the proposed riprap will improve fishing access. In addition, the riprap will help prevent bank degradation caused by fishermen on foot. Use of facilities and bank fishing opportunities by the handicapped would be made easier. In addition, improved water quality in the reservoir will allow higher quality use than is possible at present.

PUBLIC HEALTH

3.12 Improvement of water quality at Lake Traverse would benefit the public health of residents living adjacent to the reservoir. Present water quality conditions create a foul odor which is extremely unpleasant for these residents. The water quality effects of the proposed actions are not quantifiable at this time, however.

LAND USE

3.13 The modifications would enhance the ability of the recreation areas to serve their designated use. Expansion of parking and picnicking facilities would increase the use of project lands for recreational purposes. Farming and grazing on Corps-administered land would be terminated on approximately 401 acres. This land will then be intensively managed for wildlife.

ECONOMIC EFFECTS

3.14 Regional Economy - Purchase of materials for the proposed improvements would benefit regional business activity and increase tax revenues. (Total construction and removal costs for the three recreational areas are estimated at $128,000.) It is expected that most of the contract work would be done by regional firms. It is unlikely that large construction firms from outside the region would become involved in the work because of the small size of the individual projects and because the construction would be spread over an extended period of time.

3.15 Local Economy - Some additional employment would be stimulated since the Corps would have to employ a few additional people to supervise the expanded facilities. Also, contractors may locally hire additional people, at least on a part-time basis, to undertake the individual projects. There would be short-term benefit to local service businesses from the presence of construction workers; and, if more people travel to the lake as a result of the improved facilities, there would also be long-term benefit to these businesses.

3.16 Farming on Corps-administered lands on the perimeter of the lake would no longer be allowed. Grazing leases on 4 tracts would be terminated upon their expiration. The termination of convenient grazing and watering of livestock, along with enforcement of local, State and Federal water quality standards may raise the economic cost of livestock maintenance.

POSSIBLE CONTROVERSY

3.17 The termination of grazing leases and elimination of livestock access to the lake will probably be objectionable to those farmers who will thereby lose accustomed privileges of agricultural use. But the termination of these privileges is not in the nature of a penalty, nor is it a condition arbitrarily imposed. The situation is more nearly that of a subsidy removed from a few in favor of the legally-founded expectations of a regional public. (Public involvement efforts by the Corps indicate that there are groups interested in various forms of recreation which have been curtailed by deteriorating water quality.) The same principle of distributive equity would apply to restraining the release of insufficiently treated municipal sewage into the Mustinka River.

NATURAL RESOURCE EFFECTS

3.18 Air Quality - The proposed modifications should have no appreciable effect upon air quality. Construction equipment would emit small amounts of hydrocarbons and oxides.

3.19 Terrestrial Habitat - Expansion of the public-use area at Brown's Valley Dike would reduce the existing habitat for certain small birds and mammals. This minor loss of habitat, however, would be more than balanced by the following proposed habitat management measures:

a. Eliminating grazing would create a buffer of vegetation along the lake edge which may allow development of natural grassland communities, a valuable wildlife habitat.

b. Development of a grassland program to manage present project land is desirable. As leased land returns to Corps control, its inclusion in a grassland management plan would increase potential wildlife habitat and help to control runoff into Lake Traverse. Pressure on existing wildlife habitat would decrease and measures to improve water quality would begin.

c. Planting of the food plots would add to the value of the habitat, especially for deer and pheasants.

d. Creation of shallow water dugouts would benefit nesting waterfowl.

3.20 Habitat Diversity and Biological Productivity - The proposed plantings will provide food and cover for wildlife and would add to the diversity of wildlife habitat. Allowing recovery of grassland habitat around the lake and on grazed lands would increase nesting cover for waterfowl and ground-nesting birds such as pheasants. The shallow water dugouts would also increase habitat diversity, especially for waterfowl and mammals such as muskrats. The prospective increase in habitat productivity should result in some increased wildlife productivity.

3.21 Aquatic Habitat and Wetlands - About 400 square feet of rushes would be covered as a result of the separate riprap project. This is a small, narrow part of the abundant wetlands around Mud Lake and would be a minor habitat loss. The bottom geometry would be elevated and the substrate would be changed from soft sediments, with its associated benthic invertebrate community, to rock. Also, the riprap would reduce erosion of bank soils into the lake.

3.22 Threatened or Endangered Species - The proposed modifications are not expected to adversely affect any threatened or endangered species. (See paragraph 2.13.)

3.23 Surface Water - The following proposed measures would probably result in improved water quality and thereby would enhance recreational uses of the lake and increase the values of residences and resorts:

a. Elimination of farming to the lake's edge would create a buffer zone of vegetation around the lake which would help to eliminate runoff containing nutrients.

b. Elimination of direct access by livestock to the lake and elimination of cattle yards adjacent to the lake's edge and tributaries would also benefit re-establishment of vegetation and reduce nutrient sources to the lake.

3.24 Proposed expansion of Corps facilities will not adversely affect water quality. During construction, proper construction techniques can effectively eliminate siltation from construction sites.

3.25 Soil Erosion - Soil would be exposed by some of the projects. However, erosion potential would be minimal because of the small scope of the individual projects and because disturbed areas would be revegetated soon after the completion of construction. The landscape plantings and elimination of grazing would help to control erosion.

3.26 Energy Needs and Resources - As a result of the construction and maintenance of the proposed action, energy resources would be consumed to operate vehicles and machinery. Some of the construction materials used would also require energy for their production.

4.00 ALTERNATIVES TO THE PROPOSED ACTION

NO ACTION

4.01 The no action alternative would be not to implement any of the proposed changes. Under this alternative, the impacts discussed in Section 3.00 would not occur. The recreation areas would continue to function as they currently do. Existing water supply, restroom, information, parking, and recreation facility shortcomings would not be corrected.

ALTERNATIVE SITES

4.02 Alternative locations do exist on Corps-owned lands, where minimal health and safety facilities could be provided. However, past public use has clearly demonstrated a preference for the three sites where improved facilities are proposed in the Master Plan, probably because these sites offer comparatively good fishing opportunities and easy access.

GREATER OR LESSER IMPROVEMENT MEASURES

4.03 The proposed modifications are considered to be optimum development. Lesser facilities would not meet the needs of the area as expressed by the public. Greater site development would tend to be destructive of the natural resources of and around Lake Traverse and would not be justified by current demand predictions.

5.00 CONCLUSION

I conclude that the proposed improvements for the Lake Traverse - Bois de Sioux project are in the best public interest, and will not have significant adverse impacts affecting the quality of the human environment. Therefore, an environmental impact statement will not be prepared under the provisions of the National Environmental Policy Act of 1969 and applicable Corps of Engineers regulations and guidance.

15 JUNE 1979
DATE

WILLIAM W. BADGER
Colonel, Corps of Engineers
District Engineer

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2. Center for Environmental Studies, Tri College University, Fargo, North Dakota. Environmental Assessment of Lake Traverse, 1975. Contract No. DACW37-74-C-0050, U.S. Army Corps of Engineers, St. Paul District, St. Paul, Minnesota.

3. Bureau of Environmental Planning and Protection, Minnesota Department of Natural Resources, Minnesota State Comprehensive Outdoor Recreation Plan, 1975.

4. South Dakota Division of Parks and Recreation, South Dakota Comprehensive Outdoor Recreation Plan, 1975.

5. North Dakota Outdoor Recreation Agency, 1975. North Dakota State Comprehensive Outdoor Recreation Plan.

COMMON BIRD SPECIES IN LAKE TRAVERSE PROJECT AREA

Common Name	Scientific Name
Mallard	Anas platyrhynchos
Pintail	Anas acuta
Blue-winged teal	Anas discors
Lesser scaup	Aythya affinis
Northern shoveler	Anas clypeata
Redhead	Aythya americanus
Ruddy duck	Oxyura jamaicensis
Common coot	Fulica americana
White pelican	Pelecanus erythrorhynchos
Double-crested cormorant	Phalacrocorax auritas
Western meadowlark	Sturnella neglecta
Red-winged blackbird	Agelaius phoeniceus
Brown-headed cowbird	Molothrus ater
Common grackle	Quiscalus quiscula
Song sparrow	Melospiza melodia
Barn swallow	Hirundo rustica
Rough-winged swallow	Stelgidopteryx ruficollis
Bank swallow	Riparia riparia
Tree swallow	Iridoprocne bicolor
Cliff swallow	Petrochelidon pyrrhonota

EXHIBIT 1

COMMON MAMMAL SPECIES IN LAKE TRAVERSE PROJECT AREA

Common Name	Scientific Name
Little brown bat	Myotis lucifugus
White-tailed jackrabbit	Lepus townsendii
Cottontail rabbit	Sylvilagus floridanus
Woodchuck	Marmota monax
Eastern chipmunk	Tamias striatus
Pocket gopher	Geomys bursarius
Muskrat	Ondatra zibethica
Raccoon	Procyon lotor
Striped skunk	Mephitis mephitis
Badger	Taxidea taxus
Red fox	Vulpes fulva
Thirteen-lined ground squirrel	Citellus tridecemlineatus
Red Squirrel	Tamiasciurus hudsonicus
Gray Squirrel	Sciurus carolinensis
Fox squirrel	Sciurus niger
Prairie deer mouse	Peromyscus maniculatus
White-footed mouse	Peromyscus leucopus
Meadow jumping mouse	Zapus hudsonicus
Common meadow vole	Microtus pennsylvanicus
Redbacked vole	Clethrionomys gapperi
Masked shrew	Sorex cinereus
Short-tailed shrew	Blarina brevicauda

EXHIBIT 2

FISH SPECIES FOUND IN LAKE TRAVERSE

Common Name	Scientific Name
Carp	*Cyprinus carpio*
Largemouth Buffalofish	*Ictiobus cyprinellus*
Sheepshead (Freshwater Drum)	*Aplodinotus grunniens*
White bass	*Roccus chrysops*
Walleye	*Stizostedion vitreum*
Northern pike	*Esox lucius*
Yellow bullhead	*Ictalurus natalis*
Brown bullhead	*Ictalurus nebulosus*
Black bullhead	*Ictalurus melas*
Black crappie	*Pomoxis nigromaculatus*
White crappie	*Pomoxis annularis*

EXHIBIT 3

HERPETOFAUNA PROBABLY LIVING IN PROJECT AREA

COMMON NAME	SCIENTIFIC NAME
Reptiles:	
Terrestrial	
Western hog-nosed snake	*Heterodon nasicus*
Plains garter snake	*Thamnophis radix*
Prairie skink	*Eumeces septentrionalis*
Semi-aquatic	
Painted turtle	*Chrysemys picta*
Snapping turtle	*Chelydra serpentina*
Amphibians:	
Tiger salamander	*Ambystoma tigrinum*
Leopard frog	*Rana pipiens*
Chorus frog	*Pseudacris nigrita*
American toad	*Bufo americanus*
Rocky Mountain toad	*Bufo woodhousei*

EXHIBIT 4

ENVIRONMENTAL IMPACT ASSESSMENT MATRIX

MAGNITUDE OF PROBABLE IMPACT

NAME OF PARAMETER	INCREASING BENEFICIAL IMPACT ← SIGNIFICANT	SUBSTANTIAL	MINOR	NO APPRECIABLE EFFECT	INCREASING ADVERSE IMPACT → MINOR	SUBSTANTIAL	SIGNIFICANT
A. SOCIAL EFFECTS							
1. Historical/Archaeological Values				Unknown			
2. Noise Levels					X		
3. Aesthetic Values			X				
4. Recreational Opportunities			X				
5. Transportation				X			
6. Public Health & Safety				X			
7. Community Cohesion (Sense of Unity)				X			
8. Community Growth & Development				X			
9. Business and Home Relocations				X			
10. Existing/Potential Land Use			X				
11. Controversy				Possible			
B. ECONOMIC EFFECTS							
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services			X				
4. Regional Growth				X			
5. Employment			X				
6. Business Activity			X				
7. Farmland/Food Supply					X		
8. Commercial Navigation				X			
9. Flooding Effects				X			
10. Energy Needs and Resources					X		
C. NATURAL RESOURCE EFFECTS							
1. Air Quality				X			
2. Terrestrial Habitat			X				
3. Wetlands					X		
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion			X				
6. Biological Productivity			X				
7. Surface Water Quality			X				
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
11. Threatened or Endangered Species				X			

NCS Form 81 (NCS 81 (TEST) & NCS 81-2(TEST) 13 Apr 78 Obsolete)
9 April 1979

EXHIBIT 5

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
1135 U. S. POST OFFICE & CUSTOM HOUSE
ST. PAUL, MINNESOTA 55101

REPLY TO
ATTENTION OF:
NCSED-ER

NEGATIVE DECLARATION

In accordance with the National Environmental Policy Act of 1969, the St. Paul District, Corps of Engineers, has assessed the environmental impacts of the following project:

RIPRAP PLACEMENT AT RESERVATION HIGHWAY DAM

LAKE TRAVERSE

The environmental review process indicates that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement will not be prepared.

The attached environmental assessment summarizes our environmental review.

15 September 1977

FORREST T. GAY, III
Colonel, Corps of Engineers
District Engineer

EXHIBIT 6

Description and Location of the Proposed Action

The proposed area of bank restoration and riprap is about 200 feet by 4 feet and is located downstream from the Reservation Dam control structure on the east side of the channel and adjoining the picnic grounds.

Environmental Impact Assessment

a. Social Effects

(1) Archaeological and Historical Values - In compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593, the National Register of Historic Places has been consulted and as of 16 August 1977 there are no properties included on or determined eligible for inclusion on the Register in the construction area. The project area will be examined by a professional archaeologist for presently unknown cultural remains. In the event that cultural remains are located within the construction area, their significance will be evaluated according to National Register criteria, and any adverse impacts will be mitigated.

The project is located within the Ancient River Warren Channel, which is a Nationally Registered Natural Landmark. It is our determination that this Corps action will not have a significant impact upon the Natural Landmark. This determination will be provided to the National Park Service for their review.

(2) Recreation Opportunities - The proposed area of riprap would be in agreement with the revised development plan for Reservation Highway Recreation Area being prepared for the Lake Traverse Master Plan. Presently, the area is used for bank fishing and the proposed riprap will improve fishing access. In addition, the riprap will help prevent bank degradation caused by fishermen on foot.

b. Economic Effects

Public Facilities - Riprapping the proposed area for bank fishing would improve the public facilities at Reservation Highway Recreation Area.

c. Natural Resource Effects

(1) Existing Vegetation, Aquatic Habitat, and Wetlands - About 400 square feet of rushes would be covered by the riprap. This is a small, narrow part of the abundant wetlands around Mud Lake and would be a minor habitat loss.

EXHIBIT 6

(2) Surface Water Quality and Soil Erosion - Erosion of bank soils into the surface water would be reduced.

d. Alternatives to the Proposed Action

Other than the no action alternative, there appear to be no reasonable alternatives to the proposed action.

404(b) Evaluation of
Maintenance Activities
Bank Restoration Reservation Highway Dam on Lake Traverse

Description and Location of the Proposed Action

The proposed area of bank restoration and riprap is about 200 feet by 4 feet and is located downstream from the Reservation Dam control structure on the east side of the channel and adjoins the picnic grounds.

EXHIBIT 6

ENVIRONMENTAL IMPACT ASSESSMENT
Permit Application Number:

NAME OF PARAMETER	PROBABLE IMPACT				
	BENEFICIAL			ADVERSE	
	Significant	Minor	No Appreciable Effect	Minor	Significant
I. SOCIAL EFFECTS					
a. Noise Levels			X		
b. Aesthetic Values			X		
c. Historical Values			Unknown		
d. Archaeological Values			Unknown		
e. Recreational Opportunities		X			
f. Transportation			X		
g. Public Health			X		
h. Community Cohesion			X		
i. Community Growth			X		
j. Population Displacement			X		
k. Effects on Man-made Resources			X		
l. Existing/Potential Land Use			X		
m. Controversy			None Expected		
II. ECONOMIC EFFECTS					
a. Property Values			X		
b. Tax Revenues			X		
c. Public Facilities		X			
d. Public Services			X		
e. Regional Growth			X		
f. Employment			X		
g. Business Activity			X		
h. Displacement of Farms			X		
i. Commercial Navigation			X		
j. National Economic Development			X		
III. NATURAL RESOURCE EFFECTS					
a. Existing Vegetation					X
b. Terrestrial Habitat			X		
c. Aquatic Habitat					X
d. Habitat Diversity and Interspersion			X		
e. Biological Productivity			X		
f. Wetland Quality and Quantity					X
g. Air Quality			X		
h. Surface Water Quality		X			
i. Groundwater Quality			X		
j. Soil Erosion		X			
k. Threatened or Endangered Species			X		

EXHIBIT 6

	PROBABLE IMPACTS		
	BENEFICIAL	NO APPRECIABLE EFFECTS	ADVERSE
I. Physical Effects			
A. Potential destruction of wetlands-effects on:			
1. Food chain production			X
2. General habitat			X
3. Nesting, spawning, rearing and resting sites for aquatic or land species		X	
4. Those set aside for aquatic environment study or for refuges		X	
5. Natural drainage characteristics		X	
6. Sedimentation patterns		X	
7. Flushing characteristics		X	
8. Current patterns		X	
9. Wave action, erosion or storm damage protection		X	
10. Storage areas for storm and flood waters		X	
11. Prime natural recharge areas		X	
12. Cumulative effects of alterations		X	
B. Impact on water column			
1. Reduction in light transmission		X	
2. Aesthetic values		X	
3. Direct destructive effects on nektonic and planktonic populations		X	
C. Covering of benthic communities			
1. Actual covering of benthic communities			X
2. Changes in community structure or function			X

EXHIBIT 6

	PROBABLE IMPACTS		
		NO APPRECIABLE	
	BENEFICIAL	EFFECTS	ADVERSE
I. Physical Effects (continued)			
D. Other effects			
1. Changes in bottom geometry and substrate composition			X
2. Water circulation		X	
3. Exchange of constituents between sediments and overlying water with alterations of biological communities		X	
II. Chemical - Biological Interactive Effects			
A. Water column effects of chemical constituents		X	
B. Effects of chemical constituents on benthos		X	
III. Selection of Disposal Sites			
A. Impacts of fill on chemical, physical and biological integrity of aquatic ecosystem			
1. Impact on food chain			X
2. Impact on diversity of plant and animal species			X
3. Impact on movement into and out of feeding, spawning, breeding and nursery areas		X	
4. Impact on wetland areas having significant functions of water quality maintenance		X	
5. Impact on areas that serve to retain natural high waters or flood waters		X	
B. Impacts on water uses at proposed fill site			
1. Municipal water supply intakes		X	
2. Shellfish		X	
3. Fisheries (including mitigation)		X	
4. Wildlife (including mitigation)		X	
5. Recreation activities	X		
6. Threatened and endangered species		X	
7. Benthic life			X
8. Wetlands			X
9. Submerged vegetation		X	
10. Size of disposal site		N.A.	
11. Cultural resources, scenic and conservation values		Unknown	
IV. Navigation impacts			
1. Impairment to maintenance of navigation		N.A.	
2. Economic impact on navigation and anchorage		N.A.	

EXHIBIT 6

V. Quality of Fill Material

Clean riprap obtained from an existing commercial source will be used.

VI. Review State Water Quality Standards

Project implementation would probably result in a temporary violation of State water quality standards for turbidity. However, erosion of bank soils would be reduced and this would contribute to an improved water quality over the long term.

VII. Discussion

As a result of the riprap placement, the food chain production of the area would be adversely affected. Approximately 400 square feet of wetland vegetation (rushes) and its associated benthic community would be eliminated by covering. The bottom geometry would be elevated and the substrate would be changed from soft sediments to rock. The wetlands affected by this proposal constitutes a small portion of the total wetlands around Mud Lake.

In compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593, the National Register of Historic Places has been consulted and as of 16 August 1977 there are no properties included on or determined eligible for inclusion on the Register in the construction area. The project area will be examined by a professional archaeologist for presently unknown cultural remains. In the event that cultural remains are located within the construction area, their significance will be evaluated according to National Register criteria, and any adverse impacts will be mitigated.

The project is located within the Ancient River Warren Channel, which is a Nationally Registered Natural Landmark. It is our determination that this Corps action will not have a significant impact upon the Natural Landmark. This determination will be provided to the National Park Service for their review.

The proposed area of riprap would be in agreement with the revised development plan for Reservation Highway Recreation Area being prepared for the Lake Traverse Master Plan. Presently the area is used for bank fishing and the proposed riprap will improve fishing access. In addition, the riprap will help prevent bank degradation caused by fishermen on foot.